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Ospreys in Oregon and the Pacific Northwest

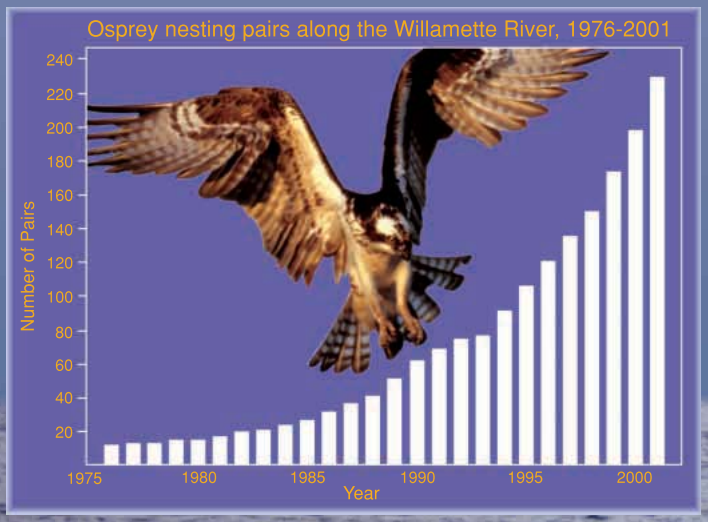
painting © Bart Rulon

A Bridge to the Wild

From early April through September each year, famous residents grace the small western town of Corvallis, Oregon. Two ospreys have become mascots of the town since the pair's arrival in 1994. Their nest, built on a 90-foot power pole near the twin bridges over the Willamette River, could be seen by many commuters on their way in and out of town. After the 2002 nesting season, the nest was moved a short distance downriver to a constructed nesting platform because sticks sometimes dropped from the huge nest onto power lines below and caused power outages. At the new location, the pair can once again raise a family of young, their general well being monitored by the 50,000 residents of the community.

Background

The osprey, often mistakenly called the fish hawk or fish eagle, was first documented in Oregon in 1855. Historically, ospreys were reported as numerous, nesting in forested areas near water because they favored dead trees or trees with flat or dead tops. Ospreys drastically declined in abundance through the mid-1970's as a side effect of pesticide use, but they have recovered and become a common nesting species along the lower Columbia and Willamette Rivers. Ospreys recently have adapted to primarily depend on power poles, cellular towers, channel markers, and similar structures for nesting sites because suitable natural nest sites (trees) are scarce. The number of pairs nesting along the Willamette River between Eugene and Portland increased from 13 pairs in 1976 to 78 pairs in 1993, and increased again to 234 pairs in 2001. Elsewhere in North America, osprey populations are following the same trend. Unlike most birds of prey, ospreys are tolerant of human activities and will build nests on almost any suitable structure close to water with an abundant supply of fish.



osprey image © Bart Rulon

The Osprey

Class: *Aves*
Order: *Falconiformes*
Family: *Accipitridae*
Genus and species: *Pandion haliaetus* (Latin, sea eagle)

Identification:

Dark brown above, white below, with white head and prominent dark eye stripe.

Body Size:

Weight: 2.5-4.5 pounds (1,200-1,900 grams); wingspan: ~56 inches (142 centimeters).

Distribution:

Worldwide; in Oregon around large rivers, lakes, reservoirs, and estuaries.

Legal Status:

Protected under Migratory Bird Treaty Act of 1918; not endangered or threatened under U.S. Endangered Species Act.

Osprey breeding range within the United States.

Nest Size:

An average-sized nest measured in Corvallis, Oregon weighed 264 pounds (120 kilograms) and was 41 inches (104 centimeters) in diameter.

Eggs:

Range 1-4, usually 3; creamy white, slightly larger than chicken egg, and heavily blotched with dark brown; hatch in about 38 days.

Diet:

99+% fish; plunges into water feet first using a reversible front talon and foot pads with tiny impaling spines (spicules) for grasping slippery fish.

Lifespan:

Maximum 25 years in the wild.

U.S. Department of the Interior
U.S. Geological Survey

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Most of the fish (83%) caught by osprey in the Willamette River in 1993 were largescale suckers, which are numerous and undesirable to anglers. Ospreys are able to catch these fish (usually in shallow, clear water) by hovering and then plunging up to 3 feet (1 meter) into the water to capture the fish. Their dense, oily feathers make them well suited to repel water and quickly regain flight. The male brings fish to the female throughout the incubation and nestling periods, and also shares a small portion of the incubation duties. The female remains in nearly constant contact with the chicks until they are about 35-40 days old. She then leaves the nest more often to perch nearby, and occasionally shares hunting duties with the male until the chicks are able to fly at about the age of 52 days. An osprey pair raising two nestlings consumes about 375 pounds (170 kilograms) of fish during the breeding season. This means that the 234 pairs found along the Willamette River in 2001 probably consumed 88,000 pounds (40,000 kilograms) of fish during their six-month nesting season in Oregon, before they migrated south to wintering grounds during late August or September.

Osprey Nesting Chronology, Willamette Valley, Oregon

Arrival at nest sites	20 March - 15 April
Clutch completion	13 April - 20 May
Hatching	21 May - 27 June
First flight of young	15 July - 21 August
Departure to wintering grounds	20 August - 25 September

Ospreys and Contaminants

Ospreys are at the top of the aquatic food chain, and are thus exposed to many pollutants found in the environment. Toxic chemicals are present in water, air, sediments, and aquatic biota throughout osprey breeding and wintering ranges. Many of these contaminants bioconcentrate from water passed through fish gills, and bioaccumulate in the fish from their food. The efficient transfer of chemicals from food to consumer through two or more trophic levels results in biomagnification, a systematic increase in tissue residue concentrations from one trophic level to another. Residues of some organochlorine insecticides, polychlorinated biphenyls (PCBs), dioxins, and furans, have been found in the Willamette River and are potentially toxic to fish, wildlife, and humans. DDT, a well-known pesticide, breaks down to form DDE, which causes eggshells to thin and be easily broken, even under the female's tender care. Because of eggshell thinning, osprey productivity decreased in the 1950's and 1960's, causing populations to decline dramatically until the ban of DDT in 1972. Osprey populations have recovered noticeably due to reduced DDE levels in the environment, increased respect and appreciation of raptors by the public, and their recent adaptation to human-made structures for nest sites.

Ospreys as Biological Indicators

Why are ospreys good biological indicators of ecosystem health?

- long-lived and top predators of aquatic food webs
- 99+% of diet is fish captured near the nest site
- each pair mates for life and returns to the same nest annually
- single nests are often distributed at regular intervals along rivers and sometimes in colonies near estuaries with abundant fish populations
- often build large, visible nests on accessible structures
- tolerate short-term disturbance at nest site

These traits allow researchers to quickly locate nests at strategic sites, such as above and below urban areas, industrial sites, and dams, and remove a sample egg. The egg serves as a snapshot of the contaminants in the female osprey's body at the time the egg formed. For example, chemical analysis of osprey eggs collected from the Columbia River show that the osprey egg with the highest level of PCBs came from a nest just below Bonneville Dam. Several years later, a dumpsite of electrical equipment containing PCBs was discovered in the Columbia River near the same site.

Charles Henny, Jim Kaiser, and Robert Grove, with the U.S. Geological Survey (USGS), initiated detailed studies along the Willamette (1993) and lower Columbia River (1995) to evaluate contaminants in osprey eggs and determine if ospreys could be used as biological indicators for long-term monitoring of contaminants and general health of rivers. Initial studies funded by the USGS Biomonitoring Environmental Status and Trends (BEST) Program focused on studies of contaminants in fish; however, because the biomagnification rate of different contaminants from fish to fish-eating birds varies tremendously, ospreys are now being tested for the program. Initial findings, based on data collected along the Willamette River in 1993, show that some contaminants biomagnify from fish to an osprey egg by a factor of 200 or more, whereas others show considerably less biomagnification. Therefore, data describing contaminant residues from fish alone are of limited use in evaluating possible contaminant effects on ospreys or other fish-eating birds. The biomagnification rate (fish to osprey egg) is critical when interpreting the relationship between residue levels in fish and effects of contaminants on ospreys. Research is underway in Oregon and Washington to better understand these relationships.

Utility company workers assist USGS scientists in collecting an egg from a nest.

Use of Power Poles and Channel Markers as Nest Sites

The rapid osprey population increase along the Willamette River during the past decade has resulted in about 25 new nesting pairs each year, with most nests built on power poles. This population increase has caused challenges for two inadvertent providers of nest sites—electric utility companies along the Willamette River and the U.S. Coast Guard along the Columbia River. About 74% of the 234 osprey nests found along the Willamette River in 2001 were built on or immediately adjacent to power poles. Utility companies relocated many nests to safer nesting platforms either above the power-pole wires or to nearby non-energized poles. The huge stick nests (3 to 4 feet; 1 meter) built on the double cross arms at the top of energized power poles often cause power outages when sticks interfere with electrical conductors. Also, the electrocution potential is extreme for ospreys attempting to build new nests on power poles or use the poles for perching because the osprey's nearly 5-foot (1.5 meter) wingspan can complete the circuit between the closely spaced conductors and grounded wires or hardware (**Photos A & B**). Utility companies use several remedial actions to resolve power outages and electrocution problems while accommodating nesting osprey. For example, they can provide an alternative nesting platform on top of the power pole and above the wires (**Photo C**). Or, the nest can be isolated from the wires leading to the power pole by insulating energized wires and parts and by adding extension links and jumper wires (**Photo D**). This modification allows completion of the electrical connection without the energized wires reaching the cross arms that support the nest. Another option is to install a nesting platform on a tall, non-energized nearby pole, which is readily accepted by the osprey. The old nest is removed from the energized power pole, and modifications are made to the power pole to deter the osprey from re-nesting there (**Photo E**). Some of these nest deterrent designs are clearly ineffective (**Photo F**), whereas others are more effective (**Photo G**). These alternative solutions are best implemented after the breeding season. If the nests are interfering with the electrical supply during the breeding season, pruning of long nest sticks can help prevent immediate power outages.

Photos A & B

Photos C (left) & D (above)

Photo E

Osprey nests can be hazards to vessel navigation throughout the Pacific Northwest. The osprey population increase along the lower Columbia River has resulted in many nests on channel markers, potentially blocking the view of navigation lights. The U.S. Coast Guard, which is responsible for maintaining navigation structures, is accommodating osprey by constructing lateral nest platforms away from lights (**Photo H**).

USGS scientists, in collaboration with local utility companies and the Avian Powerline Interaction Committee of the Edison Electric Institute, are evaluating electrocution rates of nesting osprey in the Willamette Valley and cost-effective ways to minimize raptor electrocution and nest-caused power outages, including the effectiveness of various nest deterrent devices. The results should prove valuable for managing nesting osprey on power poles not only in the Pacific Northwest but elsewhere in the United States.

Photo F

Photos G (above) and H (right)

Osprey Migration Patterns

Scientists study the migration routes of adult osprey from nest sites in western Oregon to wintering grounds by temporarily attaching small transmitters (1.15 ounces; 30-35 grams)

An osprey fitted with a temporary transmitter for tracking its migration via satellite (note: antenna on back).

to ospreys and tracking their movements with satellite receivers. Members of adult osprey pairs migrate separately and winter at different locations, reuniting each spring at the nest after a six-month hiatus. Thirteen ospreys have been tracked to southern Mexico, one to El Salvador, and one to Honduras, each following its own route annually. Many osprey winter in coastal areas like Mazatlan and Puerto Vallarta. Ospreys nesting in other parts of the United States winter farther south into Central and South America.
The World-Wide Web makes it possible for the results of the osprey satellite tracking to be widely available through an educational program called "Highway to the Tropics" (http://www.raptor.cvm.umn.edu). The program is designed for teachers and schoolchildren but has valuable information about migrating raptors for anyone interested in the subject.

The annual migration of osprey has been traced from Oregon and Washington to various locations in Southern Mexcio and Central America.

A Beneficial Coexistence

Charismatic, adaptable wildlife that live in close proximity to humans, like the osprey, motivate people to care about their natural world. Research reveals that ospreys can warn us of harmful environmental conditions in and near our communities. We can return the favor by doing what we can to make the environment safer for the birds—constructing and maintaining safe, appropriate nesting platforms, and keeping our waterways clean and clear. This sort of coexistence between wildlife and humans contributes to our survival as well as that of the other species on this planet.

35-40 day-old ospreys

Photos:
Courtesy of Erik Ackerson, Bruce Dishaw, Thad Furlong, Robert Grove, James Kaiser, and Michael Taft.

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Suggested reading:

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